

# Developing a Comprehensive Financial Reporting Governance Framework Using AI Techniques

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## ABSTRACT

**Financial Reporting Governance (FRG) comprises the structures, controls, and assurance processes that safeguard the accuracy, integrity, and compliance of financial reports. This paper proposes a Comprehensive Financial Report Governance Framework (CFRGF) that integrates Artificial Intelligence (AI) to strengthen oversight across the reporting lifecycle. Using a design science methodology, a structured literature review and concept mining are conducted to derive governance requirements, map them to AI capabilities, and iteratively design CFRGF components, decision flows, and control points. CFRGF organizes governance into four pillars: Data Governance and Quality, Algorithmic Transparency and Integrity, Anomaly and Fraud Detection, and Regulatory Compliance and Auditability. It specifies the roles, responsibilities, controls, escalation paths, and monitoring metrics. The current study details how AI supports risk scoring, outlier detection, exception prioritization, and continuous controls monitoring while preserving explainability, traceability, and human oversight. Implementation guidance encompasses data readiness, model validation, and drift monitoring, segregation of duties, and evidence collection for internal audit and external assurance purposes. The contribution presents a cohesive and implementable blueprint that aligns FRG principles with modern AI tooling, enhancing efficiency, accuracy, and transparency in practice. Organizations can use CFRGF to benchmark current controls, plan AI-enabled enhancements, and structure verifiable evidence for compliance, thereby reducing reporting risk and improving the timeliness and decision usefulness of disclosures.**

*Keywords-artificial intelligence; finance report governance; design science methodology*

## I. INTRODUCTION

FRG comprises the structures, controls, and assurance activities that safeguard the accuracy, integrity, and compliance of financial reports [1-3]. Scaling data volumes and evolving regulatory expectations increase the difficulty of maintaining effective governance across the reporting lifecycle [4, 5]. Advances in AI enable anomaly detection, continuous monitoring, and assisted review that can enhance assurance when deployed with appropriate safeguards [6, 7]. Many organizations, however, adopt isolated analytics or point solutions without an integrated governance blueprint that specifies roles, controls, decision flows, evidence requirements, and model oversight, resulting in inconsistency, weak traceability, and limited auditability.

Prior research spans governance practices, reporting integrity, and fraud incidence across diverse contexts. Studies examining the effectiveness and oversight of apparatus control in public bodies, including evidence from Jawa Tengah Province, Indonesia [8, 9], identify governance practices that reduce reporting risk for both financial and non-financial disclosures [10]. Additionally, they analyze the links between corporate governance practices and the integrity and reliability

of financial reporting [11]. Empirical work evaluates whether components of corporate governance are associated with fraudulent financial reporting [12], traces the evolution of governance mechanisms and implications for financial reporting quality [13], and assesses indicator-based impacts within Pakistan's financial institutions [14] while emphasizing contextual and temporal nuances [15]. Related literature explores the use of stories in organizations as vehicles for governance meaning-making [16] and the role and extent of integrated reporting as a governance mechanism [17]. Domain-specific fraud detection illustrates how modern learning methods support pattern recognition and anomaly identification in enterprise settings [18].

As AI and computing power evolve, research is increasingly evaluating AI across various financial contexts and model families [19-21]. Practice-oriented guidance exists but may be regionally bounded (for example, with a European focus) and less rigorous in its methodological approach [22]. Peer-reviewed analyses report benefits alongside implementation barriers, such as cost and system integration [23]. Sector-specific investigations, including those in agricultural finance, yield insights that are not easily generalized [24]. Research highlights the transformative

potential of machine learning while noting persistent practical constraints [25].

This study addresses the specific gap by proposing CFRGF, which integrates FRG principles with AI-enabled controls in a single, implementable design. CFRGF organizes governance into four pillars: Data Governance and Quality, Algorithmic Transparency and Integrity, Anomaly and Fraud Detection, and Regulatory Compliance and Auditability. The objective is to design and justify CFRGF using a design science methodology that combines a structured literature review and concept mining to derive requirements, followed by iterative artifact construction and evaluation. The contributions are: (1) an actionable governance blueprint aligning FRG controls with AI capabilities, (2) implementation guidance covering data readiness, model validation and drift monitoring, segregation of duties, and evidence collection for internal and external assurance, and (3) decision flows for risk scoring, exception prioritization, and continuous controls monitoring with explainability, traceability, and accountability.

II. PROBLEM STATEMENT

Prior studies encompass a diverse range of aspects related to FRG, including corporate governance, financial reporting quality, integrated reporting, and the impact of regulations and technologies across various sectors and geographical regions. Methods include literature reviews, regression analyses, case studies, and surveys, which examine the relationships between the governance mechanisms and reporting quality. Despite these contributions, many entities still lack a cohesive and efficient approach to managing end-to-end financial reporting.

III. METHODOLOGY

The purpose of this study is to develop CFRGF following design science research [26–28]. Design science is problem-solving oriented and widely adopted in information systems because it balances practical relevance with methodological rigor [29]. By combining theoretical insights with practitioner experience, the approach yields implementable solutions for real-world challenges. The adapted methodology is displayed in Figure 1 [30-34].

A. Preparation

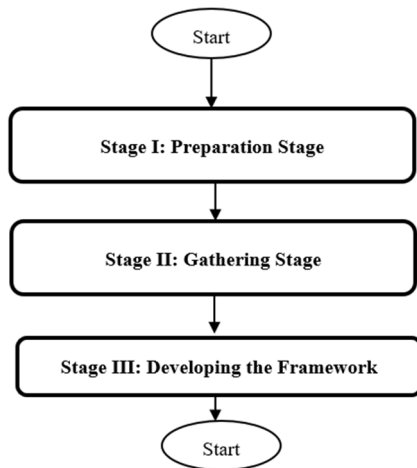


Fig. 1. Adapted methodology.

This stage establishes search controls to guide the review by defining two key elements: online databases and search rules. The considered databases are IEEE Xplore, Scopus, Web of Science, SpringerLink, ScienceDirect, and Google Scholar. The rules applied across all sources are a publication date window of 2015–2025, the keywords "Finance Report," "Governance," and "AI," and the English language constraint. A summary of the retrieved records is provided in Table I.

TABLE I. SUMMARY OF SEARCHING ONLINE DATABASES

Search engine	Year	Keywords	Language	Sources					
				Chapter	Article	Research article	Reference work entry	Conference paper	Review article
Springer Link	2015-2025	"Finance Report"; "Governance"; "AI"	English	96	15	14	6	3	1
Scopus	2015-2025			0	3	0	0	0	1
IEEE Xplore	2015-2025			0	0	0	0	7	0
Web Of Science	2015-2025			0	0	2	0	0	0
Science Direct	2015-2025			6	3	107	4	1	6
Google Scholar	2015-2025			590	1550	835	0	2100	225

B. Gathering

This stage comprises data collection and filtering. Using the Stage I protocol, the repositories returned a total of 5,553 records: Scopus (4), Web of Science (2), SpringerLink (111), IEEE Xplore (7), and Google Scholar (5,300). The screening applied explicit inclusion criteria, namely publication in pertinent peer-reviewed academic journals. A focus was placed on financial reports, AI, and governance models or frameworks, as well as comprehensive descriptions of economic reports, AI, and governance models. The exclusion criteria removed items not published in pertinent peer-reviewed journals, studies addressing only general financial reports or generic governance frameworks, papers offering solely theoretical insights without empirical evidence, and works lacking detailed descriptions of the financial reports, AI components, and governance models employed. After screening, 23 articles focusing on finance reports and governance were retained (Table II), and these sources form the basis for the framework engineering in Stage III [35-39].

C. Framework Development

CFRGF is constructed by systematically extracting standard processes and core concepts from the 23 retained studies. Processes and concepts are drawn from the main textual content to avoid missing relevant details [40-45]. Consistent

with prior procedures [46-48], extraction is performed manually. In addition, a concept mining step is adapted from [49, 50] to consolidate terminology and resolve overlaps. The resulting artifact is illustrated in Figure 2, comprising five stages with two operational steps that demonstrate how AI supports governance controls.

The framework operationalizes CFRGF through five stages. Financial assessment analysis utilizes automated ratio analysis, where AI computes and interprets liquidity, profitability, and solvency ratios to accelerate analysis and reduce errors. Additionally, it employs predictive financial modeling, which forecasts revenue, expenses, and other key metrics to support planning and decision-making. Data quality and integrity rely on automated data reconciliation, which aligns data from multiple sources to reduce inconsistencies and enhance reporting reliability. Additionally, AI-powered data validation applies checks at the entry and process stages to minimize compliance risk. Fraud detection combines anomaly detection, which identifies outliers and unusual patterns that may indicate errors or fraud for timely investigation, with text analysis, where natural language processing extracts signals from reports, emails, and notes to enrich governance insights.

Internal controls incorporate AI-driven control monitoring to evaluate control effectiveness and flag irregularities for remediation, alongside predictive risk assessment that uses historical and current data to forecast risks and enable preventive measures. Regulatory compliance utilizes automated compliance checks for routine verification of conformance with applicable rules and policies, as well as predictive compliance monitoring to identify early-warning indicators of potential breaches, allowing for prompt corrective action. Together, these stages align roles, control points, evidence production, and AI capabilities with the governance needs identified in the literature set.

TABLE II. FINANCE REPORTS PROCESSES GOVERNANCE MODELS

ID	Ref	Regulatory compliance	Internal control systems	External auditing	Ethical standards and corporate Governance	Transparency and disclosure	Risk management	Control processes
1	[30]	☒	✓	☒	☒	☒	✓	☒
2	[31]	☒	✓	✓	✓	☒	☒	☒
3	[32]	✓	☒	✓	✓	✓	☒	✓
4	[33]	✓	✓	✓	✓	✓	☒	✓
5	[34]	☒	☒	✓	☒	✓	☒	☒
6	[9]	✓	✓	✓	✓	✓	✓	☒
7	[35]	✓	✓	✓	✓	✓	✓	✓
8	[10]	☒	☒	✓	☒	✓	☒	☒
9	[11]	✓	☒	✓	☒	✓	v	v
10	[12]	✓	✓	✓	☒	☒	☒	v
11	[36]	☒	✓	☒	☒	☒	☒	✓
12	[13]	✓	☒	✓	✓	✓	v	v
13	[37]	✓	✓	✓	✓	✓	☒	✓
14	[14]	✓	✓	✓	✓	✓	☒	✓
15	[38]	✓	✓	☒	✓	✓	☒	✓
16	[39]	✓	☒	✓	✓	✓	☒	✓
17	[15]	✓	✓	✓	✓	✓	☒	✓
18	[40]	✓	☒	☒	☒	✓	☒	✓
19	[41]	✓	☒	✓	✓	✓	☒	☒
20	[42]	✓	✓	☒	☒	✓	☒	☒
21	[16]	✓	☒	✓	✓	✓	☒	✓
22	[17]	✓	☒	☒	✓	✓	☒	☒
23	[43]	☒	☒	✓	☒	✓	☒	☒

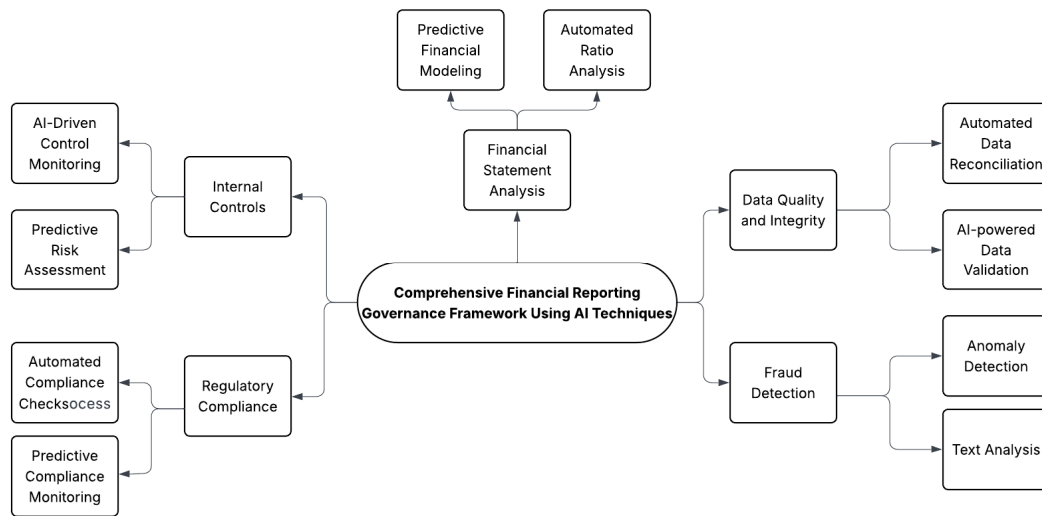


Fig. 2. Comprehensive FRG framework.

IV. VALIDATION OF THE DEVELOPED FRAMEWORK

To assess completeness and effectiveness, CFRGF is validated through comparison with established FRG models following the approach presented in [51]. The procedure normalizes concepts across the comparison set, maps each idea to the corresponding CFRGF pillar and operational step, and computes coverage as the proportion of distinct model concepts present in CFRGF relative to the union of concepts identified. Two reviewers independently performed the mapping, with adjudication for any disagreements. Table III lists the side-by-side alignment and coverage results. Based on the 23 retained FRG models, CFRGF incorporates approximately 98% of the identified concepts, indicating high completeness and consolidation of the prevailing governance practices. CFRGF is comprehensive, covering the entire set of existing FRG models and frameworks considered in this study.

TABLE III. COMPARATIVE ANALYSIS OF THE DEVELOPED CFRGF AND EXISTING FRM MODELS

ID	Ref	Controlling agreement	Interior regulator organizations	Outside checking	Proper values and corp ascendancy	Slide and revelation	Risk administration	Control procedures	AI and skill integration	Investor appointment	Sustainability reportage
1	[30]	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
2	[31]	☒	✓	☒	✓	☒	☒	☒	☒	☒	✓
3	[32]	✓	☒	☒	✓	✓	☒	☒	☒	☒	☒
4	[33]	✓	☒	✓	☒	✓	☒	✓	☒	☒	☒
5	[34]	☒	☒	☒	☒	☒	☒	✓	☒	☒	☒
6	[9]	☒	☒	☒	☒	☒	✓	☒	☒	☒	☒
7	[35]	✓	✓	✓		✓	✓	✓	☒	☒	☒
8	[10]	☒	☒	☒	☒	☒	☒	☒	☒	✓	☒
9	[11]	☒	☒	☒	☒	☒	☒	☒	✓	☒	☒
10	[12]	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
11	[36]	☒	☒	☒	☒	☒	☒	☒	☒	☒	✓
12	[13]	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
13	[37]	✓	✓	☒	✓	☒	✓	☒	☒	☒	☒
14	[14]	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
15	[38]	☒	☒	☒	☒	☒	☒	☒	☒	✓	☒
16	[39]	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
17	[15]	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
18	[40]	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
19	[41]	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
21	[42]	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
22	[16]	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
23	[17]	☒	☒	☒	☒	☒	☒	☒	☒	✓	☒
24	[43]	☒	☒	☒	☒	☒	☒	☒	✓	☒	☒
25	FRG M	✓	✓	✓	✓	✓	✓	✓	✓	✓	☒

A distinguishing feature of CFRGF is its unified emphasis on AI and enabling technologies. Whereas prior models focus primarily on traditional governance elements, such as internal controls and risk management, CFRGF integrates AI techniques to enhance and automate these activities while preserving explainability, traceability, and oversight. The comparison further confirms that CFRGF offers a comprehensive and cohesive structure that spans regulatory compliance, internal control systems, external auditing, ethical standards, transparency, risk management, and control processes, thereby reducing the fragmentation and gaps observed in individual legacy models.

V. FINDINGS AND DISCUSSION

This study developed CFRGF using design science methodology and found that the framework is highly comprehensive, integrating approximately 98% of the concepts identified from a systematic review of 23 existing FRG models and frameworks. The work addresses a key gap in the literature, since prior models are often fragmented, purpose-specific, and lack a holistic structure, which in practice contributes to inconsistent reporting and compliance complexity. The methodology followed three stages to ensure rigor and completeness. The Preparation Stage established strict search protocols across IEEE Xplore, Scopus, Web of Science, SpringerLink, ScienceDirect, and Google Scholar using the keywords "Finance Report," "Governance," and "AI," with a publication window from 2015 to 2025, yielding 5,553 records. The Gathering Stage applied explicit inclusion and exclusion criteria to retain 23 articles focused on the intersection of financial reports, governance, and AI. These articles were then analyzed to manually extract core FRG processes and concepts using established concept mining techniques. The primary finding is the CFRGF artifact itself, which is structured into five stages, each with two AI-enabled subprocesses that operationalize a modern governance model (Figure 2). The Finance Assessment Analysis combines automated ratio analysis with predictive financial modeling to support rapid and reliable diagnostics and planning.

Data Quality and Integrity utilizes automated data reconciliation and AI-powered data validation to enhance reliability and minimize compliance risk. Fraud detection utilizes anomaly detection and text analysis to identify and surface outliers and suspicious signals for timely investigation. Internal Controls integrates AI-driven control monitoring with predictive risk assessment to strengthen oversight and prevention. Regulatory Compliance automates routine checks and employs predictive compliance monitoring to provide early warnings of potential breaches. The validation against the 23 models mapped the concept presence and coverage (Table III) and showed that CFRGF incorporates nearly all identified concepts (approximately 98%). At the same time, its unified and explicit AI orientation differentiates it from traditional models that emphasize controls and risk management without technology integration. In practical terms, CFRGF unifies a scattered field by automating routine checks, improving data integrity, and providing predictive insights, thus mitigating inefficiencies, human error, and compliance issues, while it provides organizations with an end-to-end guide for managing

financial reporting. A limitation is that the framework has been validated conceptually through literature comparison rather than through deployment. Future research should implement and evaluate CFRGF in organizational settings to assess effectiveness, efficiency gains, assurance quality, and compliance outcomes in practice.

## VI. CONCLUSION

Financial governance outlines how organizations manage financial data, encompassing transaction tracking, performance evaluation, compliance, and disclosure. This study proposes a Comprehensive Financial Report Governance Framework (CFRGF) for financial reporting, utilizing a design science methodology to influence organizational behaviors and support practitioners. It explores the potential of Artificial Intelligence (AI) to enhance the framework, with an emphasis on corporate governance, reporting accuracy, and risk management. Through literature review, concept extraction, and framework development, the work introduces a validated CFRGF that encompasses approximately 98% of existing Financial Reporting Governance (FRG) models and frameworks, thus providing a holistic approach. By automating compliance checks, reconciliations, and fraud detection, the framework aims to improve efficiency, accuracy, and transparency. The study presents a unified model to address challenges in financial reporting management and identifies avenues for future research and practical application. Future work involves implementing the developed CFRGF in real-world scenarios.

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